BOOTSTRAP DIODE EMULATOR WITH DYNAMIC BACK-GATE BIASING

ABSTRACT OF THE DISCLOSURE

A bootstrap diode emulator circuit for use in a half-bridge switching circuit employing transistors connected to one another in a totem pole configuration, a driver circuit for driving the transistors, and a bootstrap capacitor for providing power to the high-side driver circuit. The bootstrap diode emulator circuit includes an LDMOS transistor having a gate, a back-gate, a source and a drain, the drain of the LDMOS transistor being coupled to the high-side supply node, the source of the LDMOS transistor being coupled to the low-side supply node; a gate control circuit electrically coupled to the gate of the LDMOS transistor, and a dynamic back-gate biasing circuit electrically coupled to the back-gate of the LDMOS transistor. The dynamic back-gate biasing circuit is operable to dynamically bias the back-gate of the LDMOS transistor when the LDMOS is turned on by applying a voltage to the back-gate of the LDMOS transistor that is close to but slightly lower than a voltage of the drain of the LDMOS transistor.